**Rosa Velez**

**Midterm:** Lesson Plan

**Grade:** 4th

**Topic:** Transfer of energy

**Lesson:** Moving pennies.

**Learning Target:** I can use pennies to demonstrate how energy can be transferred from one object to another.

**Specific Learning Outcomes:** Students will work with pennies to develop questions and predict what happens when objects collide.

**Performance Expectations:**

**Common Core Standards Met**

4-PS3-1.Use evidence to construct an explanation relating the speed of an object to the

energy of that object.

4-PS3-2. Make observations to provide evidence that energy can be transferred from place

to place by sound, light, heat, and electric currents.

4-PS3-3. Ask questions and predict outcomes about the changes in energy that occur when

objects collide.

4PS3-4 Apply scientific ideas to design, test, and refine a device that converts energy from one from another.

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| **Science & Engineering Practices:**  ○ ***Asking questions (science) and***  ***defining problems (engineering)***  ○ Developing and using models  ○ ***Planning and carrying out***  ***investigations***  ○ Analyzing and interpreting data  ○ Using mathematics and  computational thinking  ○ ***Constructing explanations***  ***(science) and designing solutions***  ***(engineering)***  ○ ***Engaging in argument from***  ***evidence***  ○ ***Obtaining, evaluating, and***  ***communicating information*** | **Disciplinary Core Ideas:**  PS3.A: Definitions of Energy  ● The faster a given object is moving, the  more energy it possesses. (4-PS3-1)  ● Energy can be moved from place to  place by moving objects or through  sound, light, or electric currents. (4-  PS3-2),(4-PS3-3)  PS3.B: Conservation of Energy and Energy  Transfer  ● Energy is present whenever there are  moving objects, sound, light, or heat.  When objects collide, energy can be  transferred from one object to  another, thereby changing their  motion. In such collisions, some energy  is typically also transferred to the  surrounding air; as a result, the air gets  heated and sound is produced. (4-PS3-  2),(4-PS3-3)  PS3.D: Energy in Chemical Processes and  Everyday Life  ● The expression “produce energy”  typically refers to the conversion of  stored energy into a desired form for  practical use. (4-PS3-4)  **ETS1.A: Defining Engineering Problems**  ● Possible solutions to a problem are  limited by available materials and  resources (constraints). The success of  a designed solution is determined by  considering the desired features of a  solution (criteria). Different proposals  for solutions can be compared on the  basis of how well each one meets the  specified criteria for success or how  well each takes the constraints into  account. *(secondary to 4-PS3-4)* | **Crosscutting Concepts:**  **○** Patterns  **○ *Cause and effect: Mechanism and***  ***explanation***  **○** Scale, proportion, and quantity  **○** Systems and system models  **○ *Energy and matter: Flows, cycles, and***  ***conservation***  **○** Structure and function  **○ *Stability and change*** |

**Vocabulary Words:**

Energy, motion, collide, transfer

**Materials:**

**Pennies**

**Brief Lesson Description:**

In this lesson students will be able to learn how energy can be transferred from one object to another

using pennies.

**Prior Students Knowledge:**

Ask children to share What they know about energy. Chart their responses. Help children make the connection to prior experiences about energy. What kind of energies do you know? Show children some pictures and ask them what kind of energy is this?

**Introduction:**

Boys and girls today we are going work in pairs. We are going to experiment with pennies to demonstrate energy and motion.

I will give you pennies and your group will demonstrate how energy can be used to create motion. What does motion mean?

**Essential Question:**

How energy can be transferred from one object to another?

**Explore:**

Students will go to the tables and find their partners.

Give the pennies and ask them to put the pennies on the table

Direct the students to work together to show how energy can be used to create motion.

Students will record their demonstration in a the notebook. (Children have to draw the pictures how they throw the pennies)

**Explain:**

After the students have finished exploring the pennies I will introduce the concept of energy , and will remain them that there are different types of energy.

Question:

What types of energy do you remember?

What is potential energy? Stored energy

What is kinetic energy? motion energy

Do you know what is conservation of energy? (energy cannot be created or destroyed, it is transferred from one form to another)

Record answers in a chart while we are discussing .

# Show a video of Kinetic & Potential Energy Lesson For Kids(With Examples)

https://youtu.be/0lmPflVhW6U

**Elaborate:**

After watching the video and discussing the concept of energy and the types of energy that exist. Students will have the opportunity to check their demonstrations once more time, but now with other challenges. They can move their pennies by colliding each other and apply the concepts of energy while they are doing this demonstration. (transfer of energy) They also can flick the pennies and see what happen.

**QUESTIONS:**

What do you think when you collide a penny on top of each other?

What happens?

What type of energy are there?

What happens when you flick the penny that you have in your hand with the penny that is on the table?

What type of energy had the first coin?

What type of energy had the second coin in the moment to collide the first coin?

After the second coin collided with the first coin and stayed in the place of the first coin, what kind of energy did it have?

What would happen if you flick the penny faster or slower?

**Evaluate:**

After the students have had the opportunity to demonstrate other ways in which the energy is transferred from one coin to another, they have to present to the whole class their knowledge about what energy means and the types of energy that were applied during their demonstrations.

**You do Independently:**

Children who have demonstrated understanding on the topic will go back to their seats and takes notes from the day.

**Elaborate Further/ Reflect: Enrichment:**

What went well with this lesson? Why? What will I do differently based on my observations? Which children needed differentiation?

Rubric

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| ***Expectation*** | ***Level 1*** | Level 2 | Level 3 | Level 4 |
| ***Understanding Basic Concepts*** | The student:  - demonstrates limited  understanding of energy | The student demonstrates some  understanding of energy | The student demonstrates general  understanding of of energy | The student demonstrates thorough  understanding of energy  . |
| ***Design Skills*** |  |  |  |  |
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